# Impact of California firearms sales laws and dealer regulations on the illegal diversion of guns

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## ABSTRACT

**Objective** The available evidence suggests that more restrictive state firearm sales laws can reduce criminal access to guns. California has firearm-related laws that are more stringent than many other states and regulates its retail firearms dealers to a unique degree. This research seeks to examine the effect of more restrictive state gun laws and regulations on the illegal diversion of guns to criminals.

**Design** Survival analyses are used to determine whether state firearm sales laws, particularly California's legal context and regulatory regime, impact the distribution of time-to-crime of recovered firearms in that state relative to other US states.

**Setting** USA.

**Subjects** 225 392 traced firearms, where the first retail purchasers and the gun possessors were different individuals, recovered by law enforcement agencies between 2003 and 2006.

**Results** The increased stringency of state-level firearms laws and regulations leads to consistently older firearms being recovered. California was associated with the oldest recovered crime guns compared with guns associated with other states. These patterns persisted regardless of whether firearms were first purchased within the recovery state or in another state.

**Conclusions** These findings suggest that more restrictive gun sales laws and gun dealer regulations do make it more difficult for criminals to acquire new guns first purchased at retail outlets.

Gun violence remains a serious problem in the USA, with over 11 000 gun homicide victims and some 467 300 victims of non-fatal firearm crime.[1] The annual medical, criminal justice, and other government and private costs of gun violence have been estimated to be >$170 billion.[2] There are also some 300 million privately owned firearms, including roughly 100 million handguns, in the USA.[3] Given the prevalence of guns, some observers suggest that gun control restrictions on commerce and possession of firearms are futile in limiting criminal access to firearms.[4]

States vary greatly in the nature of their gun sales laws and gun dealer regulation policies and procedures.[5] A growing body of empirical evidence suggests that more restrictive state-level firearm sales laws and better regulation of gun dealers may reduce the illegal diversion of guns from lawful commerce to criminals.[6] In addition to having strong gun sales laws, California closely regulates firearms sales by in-state retail dealers. Bureau of Alcohol, Tobacco, Firearms, and Explosives (ATF) crime gun trace data were used to analyse the impact of California's more restrictive firearms commerce laws and regulatory regimes relative to legal and regulatory schemas in other US states on a key measure of the illegal diversion of firearms to criminals—the amount of time between a firearm's first legal purchase and its ultimate recovery by a law enforcement agency following its use in crime, known as time-to-crime.

## STATE FIREARMS COMMERCE LAWS AND DEALER REGULATION

Federal, state and local governments regulate commerce in firearms and the possession and use of firearms. Most jurisdictions occupy the middle ground between laissez-faire and prohibition, seeking to preserve legitimate uses of guns while minimising their use as an instrument of criminal violence.[7–10] A primary purpose of federal law is to prevent lax firearms controls in one state from undermining more restrictive regulations in another state. State gun laws and regulations vary considerably. A series of research studies have found that crime guns tend to migrate from states with less restrictive firearms sales laws to states with more restrictive laws.[11–14] A recent study used 2009 state-level ATF crime gun trace data to examine the cross-sectional association between state gun laws and the per capita rate of crime guns exported to criminals in other states, controlling for potential confounders.[6] States that exported the most crime guns per capita (Mississippi, West Virginia and Kentucky) had none of the state gun laws examined. States that exported the fewest crime guns per capita (New York, New Jersey, Massachusetts and California) had strong dealer oversight, regulated private sales and had other stringent firearms commerce laws.

More restrictive state firearms sales laws do seem to reduce the ease through which criminals illegally acquire guns from in-state dealers. A study that used aggregate ATF crime gun trace data from 53 US cities for the years 2000–2002 examined the association between state gun regulations and the diversion of guns to criminals.[15] The illegal diversion of firearms to criminals was measured as the number of guns recovered by police within 1 year of retail sales for those guns where the legal retail purchaser was not the criminal possessor. Strong regulation and oversight of gun dealers was associated with 64% less diversion of guns to criminals by in-state gun dealers. The study also found that regulation of private handgun sales and discretionary permit-to-purchase licensing were also associated with lower levels of diversion of guns sold by in-state gun dealers. Similarly, when Missouri repealed its permit-to-purchase law, the number of

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crime guns with very short sale-to-crime intervals increased sharply.[6]

California has firearm-related laws and regulations that are relatively more stringent than those in most other states. Californian residents are limited to one handgun purchase per month and a 10-day waiting period before purchased firearms can be acquired. With rare exceptions, private-party transfers must be routed through a licence retailer. Since 2003, a purchaser's right thumbprint is required on all transactions and the purchaser's name, date of birth, address and unique ID number are entered by 'swiping' a government-issued photo identification card (California driver's licence or military ID card). These regulations are designed to reduce the potential for purchasers providing false identification to firearms dealer. Beyond those convicted of a felony or domestic violence misdemeanour and other federal law prohibitions, California has adopted broader exclusions, which include persons convicted of any violent misdemeanour, such as simple assault and battery, persons served with temporary domestic violence restraining orders and persons admitted for emergency psychiatric evaluation on grounds that they pose a danger to themselves or others.

California also regulates firearm retailers to a unique degree. In addition to a federal firearms licence, all persons engaged in the business of selling firearms must possess a state Certificate of Eligibility and be named on the state's Centralized List of firearms retailers. With rare exceptions, firearm sales must be processed electronically, using software developed by the California Department of Justice and in most cases on computers supplied by the department. A sale cannot be accepted for processing unless the transaction data are complete and consistent. The California Bureau of Firearms maintains its own corps of seven field representatives who serve as inspectors. Retailers are inspected in their first year of operation and approximately every 2 years thereafter, on average. Inspections may occur more frequently if there has been a history of rule violations in the past, and less frequently if the retailer has previously been in compliance. Scheduling of inspections also takes into account the retailer's sales volume and any referrals from law enforcement agencies or the general public. Repeated and wilful violations can lead to a licensee being removed from the Centralized List. This robust commitment to dealer regulation and enforcement of state firearms sales laws distinguishes California from other states, such as Massachusetts,[12] that have strong state gun laws but lack well-developed regulatory and enforcement regimes.

## DATA AND ANALYTICAL FRAMEWORK

The ATF firearm trace data used in this article were collected through a US National Institute of Justice grant to study illegal gun markets. This kind of research is no longer possible since the 2003 passage of the Tiahrt Amendment that greatly restricts the use of such data by non-law enforcement personnel. As such, this study advances our understanding of the impact of state firearms sales laws and dealer regulations on the illegal diversion of guns by analysing the actual characteristics of specific traced crime guns, including interstate and intrastate movement patterns, rather than being limited to analysis of aggregate state-level and city-level summaries of ATF firearms data.

The Gun Control Act of 1968 (GCA) established a set of requirements that allows any given firearm to be traced from its manufacture or import to its first sale by a retail dealer. GCA mandates that each new firearm, whether manufactured in the USA or abroad, must be marked with a unique serial number. In addition, GCA requires all federally licensed firearms dealers, including manufacturers, importers, distributors and retail dealers, to maintain records of all firearms transactions. Firearms traces can be unsuccessful for a variety of reasons such as local police incorrectly completed the trace request form, the firearm was too old to trace (pre-1968 manufacture) or the gun had obliterated serial numbers.

ATF trace data can provide policy-relevant insights on illegal gun market dynamics when conclusions are based on careful analyses that are coupled with clear acknowledgements of the data limitations.[16 17] ATF and academic analyses of firearms trace data typically focus on a critical dimension of the illegal firearms market: the time between a firearm's first sale at retail and its subsequent recovery by a law enforcement agency, most often in connection with a crime ('time-to-crime'). Law enforcement investigators consider a traced firearm with short time-to-crime, defined as recovery within 3 years of first retail sale, as possibly having been recently and illegally diverted from a retail outlet.[18]

Our analysis examined 840 863 ATF trace requests for all recovered crime guns in 50 US states between 2003 and 2006. Trace requests for firearms recovered in California accounted for 11.1% of the total (93 292 of 840 863). ATF successfully traced 58.7% (493 688 of 840 863) of these recovered crime guns to a first retail purchaser. Short time-to-crime firearms represented 16% of the traced firearms recovered in California relative to 28% of the traced firearms recovered in other US states. Moreover, the mean time-to-crime was 12.2 years for California traced firearms versus 9.8 years for traced firearms recovered in other US states (a 26% difference).

These data were further restricted to examine traced firearms where the purchaser and possessor were identified as different individuals, indicating these guns changed hands at least once between their first retail purchases and recovery by law enforcement agencies. Of the 493 688 firearms traces with time-to-crime data, there were 228 305 cases (46.2%) where the purchaser and possessor were identified as different individuals. The other firearm traces involved possessors and purchasers identified as the same person or sufficient information on the crime gun possessor was not available.

To examine whether California's firearm-related laws and regulations impacted the distribution of time-to-crime of recovered firearms in that state relative to other US states, we grouped states according to the presence or absence of firearms purchase and registration laws in the state. States were classified as having no purchase and registration laws, purchase-only laws, registration-only laws or both purchase and registration laws based on the Vernick and Hepburn study of state and federal gun laws.[19] Firearms purchase laws require prospective gun buyers to first obtain a licence or permit before purchasing a firearm. Registration laws mandate permanent records of each gun sale that are kept by states in centralised locations. As of 1999, six states had purchase laws only (Iowa, Illinois, Minnesota, Montana, North Carolina and Nebraska), two states had registration laws only (California and Maryland) and five states had both purchase and registration laws (Connecticut, Hawaii, Massachusetts, Michigan, New Jersey and New York).

California, which has purchase but not registration legislation, was kept separate because it is the focus of this research and has other relevant firearms laws and regulations that provide for a more stringent regulatory context in terms of the potential trafficking of firearms. These dichotomous independent variables were included in the analysis as a series of dummy variables. To investigate the relationship between state firearms laws and in-state/out-of-state gun purchases, a set of seven legal context/

place of purchase dummy variables was constructed by interacting the four purchase and registration law contexts with the two place of purchase conditions. The reference category for this group of dummy variables is in-state firearm purchases in states with *no* purchase and *no* registration laws.

The rapid diversion of guns from legal commerce to recovery in crime by law enforcement agencies may not only be dependent on the place of purchase and the legal context of state firearms laws but also on other characteristics of local illegal firearms markets.[14 17 20–22] For that reason, a series of gun trafficking indicators based on specific characteristics of the licensed firearm dealer, first retail purchaser, crime gun possessor, purchaser–possessor relationship and recovered crime gun were included in the multivariate analysis. These same firearm commerce-based gun trafficking indicators have been shown to be significant predictors of time-to-crime in previous empirical analyses.[11] Dealer control variables included the number of traces to a dealer, the number of multiple gun sales sold by a dealer, a dummy variable for whether the dealer was a pawnshop and a dummy variable for whether a dealer was in business as of 2006 is included as a control variable. Dummy variables were used to control for the gender and age of crime gun purchasers and possessors. Other purchaser control variables included the number of traces to an individual purchaser and the number of traces from a purchaser's home residence zip code. Purchaser/possessor relationship indicators included the difference in age between purchaser and possessor, the distance between a purchaser's and possessor's home, and a dummy variable for purchasers with the same last name but different first name from a possessor.

A dummy variable was used to indicate whether the recovered crime gun was a semiautomatic pistol or another type of firearm. Finally, a modest number of jurisdictions engage comprehensive firearms tracing practices and submit guns recovered in a broader range of circumstances to ATF for subsequent tracing. Traced firearms recovered in domestic disputes, found on the street and seized for health and safety reasons are likely to be older firearms. Therefore, we included a dummy variable indicator indicating comprehensive tracing practices associated with these types of recovered firearms.

Descriptive statistics for the dependent and independent variables are listed in table 1. The distributions of variables that represent counts of events were smoothed through natural log transformations.[23] The number of cases for the multivariate analysis drops slightly to 225 392 traces due to a small amount of missing information on several explanatory variables. The level of missing data was larger for the gun trafficking indicator derived from the geographic distance between the home zip code of the first retail purchaser and the home zip code of the gun possessor (8.7%; 19 765 of 225 932 cases). To prevent dropping these cases from the empirical analysis, a dummy variable was included in the analysis to control for missing information on this particular indicator.[24]

Data that measure lifetimes or the length of time until the occurrence of an event are generally called survival data.[25 26] In this analysis, we are interested in modelling the length of time between the first retail sale of a firearm and its subsequent recovery following use in crime by law enforcement. Survival data are often censored. Of the 225 392 firearm traces in the analysis, 17 627 firearms with time-to-crime >20 years were censored (7.8%). These cases were right censored at 20 years because federally licensed dealers are not required to maintain records on the sale and purchase of firearms beyond that time. Cox proportional hazards models were used to analyse the time-to-crime (failure time) for traced crime guns included in this multivariate analysis.

**Table 1** Descriptive statistics of variables used in multivariate analysis

| | Mean | SD | Cases |
|---|---|---|---|
| Time-to-crime in years using sale date | 8.463 | 7.0727 | 225 392 |
| Independent variables | | | |
| 1. Gun law category 1—either a purchase or registration law | 0.1674 | 0.37332 | 225 392 |
| 2. Gun law category 2—both a purchase and registration law | 0.0990 | 0.29868 | 225 392 |
| 3. Gun law CA—State of California | 0.0731 | 0.26023 | 225 392 |
| 4. Active dealer—was in business at time of recovery | 0.5350 | 0.49877 | 225 392 |
| 5. Firearm was purchased in the recovery state | 0.6700 | 0.469 | 225 392 |
| 6. Natural log of the number of traces from a dealer | 3.5343 | 1.85494 | 225 392 |
| 7. Natural log of the no. of multiple gun sales sold by a dealer | 2.0665 | 2.67158 | 225 392 |
| 8. Dealer is a pawnshop | 0.2441 | 0.42957 | 225 392 |
| 9. Natural log of the no. of traces to an individual purchaser | 0.1866 | 0.45684 | 225 392 |
| 10. Purchaser age 18–24 | 0.2411 | 0.42778 | 225 392 |
| 11. Natural log of the no. of traces to purchaser's home zip code | 3.8172 | 1.30606 | 225 392 |
| 12. Purchaser is a woman | 0.1765 | 0.38123 | 225 392 |
| 13. Natural log of the difference in the age of purchaser and the age of the possessor | 2.4215 | 1.06720 | 225 392 |
| 14. Natural log of the distance between purchaser and possessor home zip codes | 3.1819 | 2.28424 | 225 392 |
| 15. Dummy variable for missing data on distance between purchaser and possessor home zip codes | 0.9187 | 0.27332 | 225 392 |
| 16. Possessor has same last name as purchaser but different person | 0.0517 | 0.22139 | 225 392 |
| 17. Possessor's age under 18 | 0.0529 | 0.22379 | 225 392 |
| 18. Possessor's age 18–24 | 0.3236 | 0.46787 | 225 392 |
| 19. Possessor's age 25–34 | 0.2972 | 0.45702 | 225 392 |
| 20. Possessor is a woman | 0.0646 | 0.24590 | 225 392 |
| 21. Recovered firearm is a pistol | 0.6232 | 0.48458 | 225 392 |
| 22. Comprehensive tracing indicator | 0.0633 | 0.24347 | 225 392 |

**Table 2** Cox regression analysing the impact of state guns laws and gun trafficking indicators on time-to-crime for traced firearms

| Independent variables | HR | SE | Significance | 95% CI |
|---|---|---|---|---|
| 1. Gun law—either a purchase or registration law | 0.937 | 0.005 | 0.000 | 0.927 to 0.948 |
| 2. Gun law—both a purchase and registration law | 0.880 | 0.007 | 0.000 | 0.867 to 0.893 |
| 3. Gun law CA—State of California | 0.779 | 0.007 | 0.000 | 0.767 to 0.792 |
| 4. Active dealer—was in business at time of recovery | 1.473 | 0.008 | 0.000 | 1.458 to 1.488 |
| 5. Firearm was purchased in the recovery state | 1.061 | 0.007 | 0.000 | 1.048 to 1.075 |
| 6. Natural log of N traces from a dealer | 1.011 | 0.002 | 0.000 | 1.008 to 1.014 |
| 7. Natural log of N multiple gun sales by a dealer | 1.051 | 0.001 | 0.000 | 1.048 to 1.053 |
| 8. Dealer is a pawnshop | 1.169 | 0.006 | 0.000 | 1.158 to 1.181 |
| 9. Natural log of N traces to an individual purchaser | 1.348 | 0.006 | 0.000 | 1.336 to 1.361 |
| 10. Purchaser age 18–24 | 0.911 | 0.005 | 0.000 | 0.902 to 0.921 |
| 11. Natural log of N traces to purchaser home zip code | 0.980 | 0.002 | 0.000 | 0.977 to 0.984 |
| 12. Purchaser is a woman | 1.182 | 0.007 | 0.000 | 1.169 to 1.195 |
| 13. Natural log of purchaser/possessor age difference | 0.663 | 0.002 | 0.000 | 0.659 to 0.665 |
| 14. Natural log of purchaser/possessor zip code distance | 0.933 | 0.001 | 0.000 | 0.930 to 0.936 |
| 15. Dummy variable—missing purchaser/possessor distance | 1.168 | 0.011 | 0.000 | 1.146 to 1.189 |
| 16. Possessor same last name as purchaser (different person) | 1.068 | 0.010 | 0.000 | 1.048 to 1.089 |
| 17. Possessor's age under 18 | 1.881 | 0.021 | 0.000 | 1.841 to 1.922 |
| 18. Possessor's age 18–24 | 2.131 | 0.014 | 0.000 | 2.104 to 2.158 |
| 19. Possessor's age 25–34 | 1.686 | 0.010 | 0.000 | 1.667 to 1.706 |
| 20. Possessor is a woman | 0.897 | 0.008 | 0.000 | 0.882 to 0.913 |
| 21. Recovered firearm is a pistol | 1.533 | 0.007 | 0.000 | 1.519 to 1.548 |
| 22. Comprehensive tracing indicator | 0.852 | 0.008 | 0.000 | 0.837 to 0.867 |

N=225 392.
Log likelihood=−2 508 154.3.
Likelihood ratio $\chi^2$=89 183.84.
Degrees of freedom=22.
p=0.0000.

## RESULTS

Table 2 presents the coefficients for the Cox regression model estimating the impact of the state firearms laws and regulations variables on the time-to-crime of traced firearms that changed hands at least once between the first retail sale and recovery by law enforcement controlling for gun trafficking indicators. Among the three legal context variables, the California variable shows the largest impact with a 22.1% decrease (1–0.779) in the RR of recovery of traced guns compared with states without purchase or registration laws. States with *both* purchase and registration laws and states with *either* purchase or registration laws show decreases in relative recovery risk of 12.0% and 6.3%, respectively. This suggests that the stringency of state firearms laws and regulations has consistent positive effects on time-to-crime with the effect becoming stronger as the legal context becomes more stringent.

The stringency of state laws should have a similar effect on time-to-crime whether a firearm was purchased within a recovery state or outside that state. For firearms recovered within a state's boundaries but purchased from a dealer outside that recovery state, table 3 shows that time-to-crime has a consistent positive relationship with the stringency of state firearms laws and regulations, independent of whether firearms were sold within recovery state boundaries or in states outside a recovery state. Similarly, time-to-crime shows a consistent and positive relationship with the stringency of state firearms legal contexts for firearms purchased from dealers within a recovery state's boundaries.

Table 4 presents the Cox regression model estimating the impacts of the seven legal contexts/places of sale dummy variables on time-to-crime, controlling for the gun trafficking indicators. For in-state gun purchases, the stringency of state legal context shows a consistent and positive effect on the length of time between a firearm's first retail sale and recovery in crime by a law enforcement agency. When compared with in-state firearm purchases in states with *no* purchase and *no* registration

**Table 3** Mean time-to-crime (in years) of traced firearms by state gun laws and purchase location

| | | State gun law context of where firearms were recovered | | | | |
|---|---|---|---|---|---|---|
| State location of dealer sale | | Has no purchase or registration law | Has purchase *or* registration laws | Has purchase *and* registration laws | California | All states |
| Recovered firearm purchased from an out-of-state dealer | Mean | 9.607 | 9.907 | 13.099 | 13.291 | 9.958 |
| | N | (59 864) | (8106) | (2759) | (3728) | (74 457) |
| Recovered firearm purchased from an in-state dealer | Mean | 7.273 | 8.189 | 10.058 | 11.516 | 7.859 |
| | N | (111 898) | (22 984) | (7011) | (11 665) | (153 558) |
| Total for all recovered firearms | Mean | 8.086 | 8.647 | 10.917 | 11.946 | 8.545 |
| | N | (171 762) | (31 090) | (9770) | (15 393) | (228 015) |

**Table 4** Cox regression analysing the impact of state guns laws by in-state and out-of-state purchases on RR of gun recovery and tracing

| Independent variables | HR | SE | Significance | 95% CI |
|---|---|---|---|---|
| Out-of-state purchase: states w/*no* purchase or registration laws | 0.902 | 0.006 | 0.000 | 0.8911 to 0.9148 |
| Out-of-state purchase: states w/purchase *or* registration laws | 0.868 | 0.010 | 0.000 | 0.847 to 0.889 |
| Out-of-state purchase: states w/purchase *and* registration laws | 0.716 | 0.012 | 0.000 | 0.691 to 0.741 |
| Out-of-state purchase: California place of purchase | 0.679 | 0.013 | 0.000 | 0.653 to 0.706 |
| In-state purchase: states w/purchase *or* registration laws | 0.908 | 0.006 | 0.000 | 0.894 to 0.920 |
| In-state purchase: states w/purchase *and* registration laws | 0.708 | 0.009 | 0.000 | 0.691 to 0.726 |
| In-state purchase: California place of purchase | 0.684 | 0.007 | 0.000 | 0.670 to 0.697 |

Reference category is in-state firearm purchases in states with *no* purchase and *no* registration laws. Covariates from table 2 were included in the Cox regression model.
N=225 392.
Log likelihood=−2 507 438.3.
Likelihood ratio $\chi^2$=90 615.74.
Degrees of freedom=26.
p=0.0000.

laws, the effect on the risk of being recovered and traced during time t is a 9.2% decrease for in-state purchases from states with purchase *or* registrations laws, a 29.2% decrease for in-state purchases from states with purchase *and* registration laws and 31.6% decrease for in-state California purchases. For out-of-state gun purchases, the analysis shows the same pattern —increases in time-to-crime length associated with increasingly stricter state legal contexts When compared with in-state firearm purchases in states with *no* purchase and *no* registration laws, the effect on relative recovery risk is a 9.8% decrease for out-of-state purchases of firearms recovered in states with *no* purchase or registration laws, a 13.2% decrease for out-of-state purchases of firearms recovered in-state with purchase *or* registrations, a 28.4% decrease for out-of-state purchases of firearms recovered in states with purchase *and* registration laws, and a 32.1% decrease for out-of-state purchases of California recovered firearms.

## CONCLUSION

Our multivariate analyses suggest that state-level laws complemented by a strong commitment to regulate firearms dealers can reduce the ease through which criminals illegally divert firearms from legal commerce. The stringency of state-level firearms laws and regulations on retail firearms sales and, in the case of California, the regular enforcement of state regulations lead to consistently longer time-to-crime for firearms from gun dealers located within their jurisdictions. Our analyses also found that crime guns originating from states with both purchase and registration laws were associated with larger reductions in the risk of recovery by law enforcement agencies compared with crime guns originating from states that had one of these types of laws but not both. Furthermore, the analyses suggest that California enforcement of state laws and regulations through routine dealer inspections and the ongoing analysis of automated records on firearm transactions for suspicious sales and purchase patterns further increased the time-to-crime of recovered crime guns originating from in-state dealers.

States with lax gun laws could impact the flow of recently purchased firearms to criminals by enacting more stringent purchase and sales laws, tracking all firearms transactions and more closely regulating licensed firearms dealers. Increasing the number of states with more stringent gun controls would also have the desirable effect of reducing the export of newer guns to criminals in tighter gun control states. Of course, the passage of tighter gun laws and implementation of meaningful regulatory actions will not eliminate all potential sources of guns to criminals who want them. Nevertheless, this approach would diminish the ease by which criminals acquire guns through illegal diversions from firearms commerce. By making the acquisition of guns more difficult, violent gun offending may also be reduced as criminals would have to economise on their illegal gun possession and use.

### What is already known on the subject

- Gun sales laws and gun dealer regulation policies and procedures vary considerably across US states. California has more restrictive firearms sales laws and more closely regulates retail gun dealers relative to other states.
- The available evidence suggests that more restrictive state-level firearm sales laws may reduce the illegal diversion of guns from lawful commerce to criminals.

### What this study adds

- This is the first national study of Bureau of Alcohol, Tobacco, Firearms, and Explosives (ATF) firearms trace data since the passage of the Tiahrt Amendment. As such, the authors were able to draw conclusions based on an empirical analysis of the actual characteristics of specific traced crime guns rather than being limited to analysis of aggregate state-level summaries of ATF firearms data.
- The stringency of state-level firearms laws and regulations on primary and secondary firearms sales and, in the case of California, the regular enforcement of state regulations leads to consistently longer time-to-crime for firearms from gun dealers located within their jurisdictions.
- States with lax gun laws could impact the flow of recently purchased firearms to criminals by enacting more stringent purchase and sales laws, tracking all firearms transactions, and more closely regulating licensed firearms dealers. This could, in turn, reduce the number of violent gun injuries in those states as criminals economise on illegal gun possession and use.

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**Contributors** GLP originated and directed the research. He also led the data preparation, statistical analysis and writing of the results. AAB and GJW helped to conceptualise the research and contributed to the analysis and writing. All authors finalised the manuscript and approved its submission for peer review.

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**Provenance and peer review** Not commissioned; externally peer reviewed.

**Human participant protection** This study was approved by the institutional review board of Northeastern University. Informed consent was not needed because all of the data used were available through the Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF), and all personal identifiers were removed.

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### Canadian doctors must report unsafe drivers

The number of drivers judged to be unfit to drive in Manitoba has not risen since 2011. However, the number of seniors has markedly increased. This suggested changes were needed in the Highway Traffic Act to require "doctors to report if a driver has a medical condition that may impair the safe operation of a motor vehicle". *Comment*: There is no evidence that the new wording will help. (Noted by IBP)

### More on raising the speed limit

Last July British Columbia raised the highway speed limit to 120 km/h on many roads. Predictably, the number of serious or fatal crashes has risen since then. A study in the *BC Medical Journal* using ambulance trauma dispatches showed a 6.5% fall after tougher impaired driving and excessive speeding laws were introduced followed by an increase of 11% after the speed limit was raised. *Comment*: No reason was given for the speed increase and road safety experts advised against it. (Noted by IBP)